The current optimal results with these developments are as follows: Using a pressure infusion bag at 300 mm of mercury, standard IV tubing and an 8.5 French catheter, in vivo flow rates of 500 ml per minute are achieved. Experimentally, using the same catheter with 6.4 mm tubing under 600 mm of mercury pressure, flow rates in vitro of crystalloid exceeded 3,000 ml per minute!

A word of warning: In the confusion surrounding the resuscitation of an exsanguinating patient, massive volume overload becomes a real danger. Therefore, careful ongoing evaluation and monitoring of intravascular volume are mandatory.

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Diagnosing Cases of Ectopic Pregnancy

ECTOPIC PREGNANCY is the leading cause of maternal death in the first trimester of pregnancy. The total number of cases of ectopic pregnancy reported in the United States rose from less than 18,000 in 1970 to greater than 52,000 in 1980. Ectopic pregnancy is extremely difficult to diagnose clinically. More than half of all cases of ectopic pregnancy are missed at first presentation, more than two thirds of ectopic pregnancies are ruptured at the time of diagnosis and 10% to 20% of patients suffer hypovolemic shock before definitive treatment is obtained.

Ectopic pregnancy must be suspected in all women of childbearing age presenting with either abdominal pain, irregular vaginal bleeding or both. While physical examination alone is unreliable in diagnosing ectopic pregnancy, culdocentesis has been found to be positive in from 75% to 94% of cases.

The two-minute agglutination-inhibition slide test for human chorionic gonadotropin (HCG) in urine remains negative until more than 1,500 mIU of HCG per ml is present, and from 30% to 50% of cases of ectopic pregnancy will be missed. The two-hour urine slide test is more sensitive (positive at greater than 250 mIU HCG per ml) but as much as 10% to 20% of cases of ectopic pregnancy may still be missed. Qualitative serum β-HCG assays are currently available, inexpensive, require only 30 minutes to do and give a positive report at a serum level of greater than 35 mIU HCG per ml. In a recent review of the literature, this test was positive in 439 of 445 (98.7%) cases of ectopic pregnancy. Quantitative serum β-HCG assays measuring levels less than 25 mIU per ml exist but are not widely available and require much longer to do.

Real-time ultrasonography is of great help in establishing the diagnosis of unruptured ectopic pregnancy. Its primary role lies in documenting a normal intrauterine pregnancy at about five to six weeks of gestation. Such a finding essentially excludes the possibility of ectopic pregnancy because the incidence of coexisting ectopic pregnancy and intrauterine pregnancy is about 1 in 30,000 pregnancies. Ultrasound examination may be of secondary importance in supporting a diagnosis of possible ectopic pregnancy by showing an adnexal mass or fluid within the cul-de-sac, or both. The ability to identify an adnexal mass as an ectopic pregnancy rather than a large ovarian cyst, hydrosalpinx, tubo-ovarian abscess or other cause of adnexal enlargement varies from center to center.

When a case of ectopic pregnancy is suspected, culdocentesis should be done. Positive findings on culdocentesis warrant a gynecologic consultation. A negative or nondiagnostic culdocentesis should be followed by pregnancy testing. A rapid two-minute urine pregnancy test that is positive should be followed by pelvic ultrasound examination. An ultrasound examination that does not show a normal intrauterine gestational sac should be followed by laparoscopy. If the two-minute urine pregnancy test is negative, it should be followed by a serum β-HCG test. A negative β-HCG test rules out an ectopic pregnancy in all but about 1% of cases. A positive β-HCG test should be followed by pelvic ultrasound study or laparoscopy. In one recently published study in which such an approach was used, all 16 patients with ectopic pregnancy from a study group of 81 patients suspected of having the disease were successfully identified.

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